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Docket No.: 00-VE13.25 CPA 1
PATENT

5/24/04

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
James CURRY *et al.*

Application No.: 08/598,457

Filed: February 8, 1996

For: SPATIAL SOUND CONFERENCE
SYSTEM AND APPARATUS

Group Art Unit: 2644

Examiner: X. Mei

Atty. Dkt. No.: 00-VE13.25 CPA 1

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APPEAL BRIEF

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APPENDIX 1 - Pending Claims

APPENDIX 2 - Exhibits

Exhibit A – Begault, Durand R., 3-D Sound for Virtual Reality and Mutlimedia, 1994,
Academic Press, Inc., pgs. 213-216.

Exhibit B – U.S. Patent Number 5,105,462 of Lowe, *et al.* (1992)

Exhibit C – U.S. Patent Number 5,371,799 of Lowe, *et al.* (1994)

Exhibit D – U.S. Patent Number 5,436,975 of Lowe, *et al.* (1995)

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APPEAL BRIEF

MS Appeal Brief - Patents

Commissioner of Patents

P. O. Box 1450

Alexandria, Virginia 22313-1450

Dear Sir:

Appellant hereby submits an original and two copies of this Brief to the Board of Patent Appeals and Interferences in response to the Office Action dated November 4, 2003, from which a Notice of Appeal was filed March 3, 2004. A check is attached covering the fee for filing the Brief in support of the instant appeal together with a one-month extension of time fee. Should any other fees be due, the Commissioner is authorized to withdraw the appropriate fee from Deposit Acct. No. 07-2347. Please date stamp and return the enclosed postcard to evidence receipt of this document.

I. REAL PARTY IN INTEREST

The real party in interest is the assignee, Verizon Services Corp.

II. RELATED APPEALS AND INTERFERENCE

There are no interferences or appeals for related cases.

III. STATUS OF THE CLAIMS

Claims 1-27 were filed with the original application. Claim 24 was amended in Appellants' first response in the initial application, of which this is a second Continued Prosecution Application. Thus, claims 1-27 are pending, stand rejected and are appealed. A copy of the appealed claims is attached as APPENDIX 1 to this brief.

IV. STATUS OF THE AMENDMENTS

The sole amendment to the claims, that being to claim 24, was earlier entered in the patent application. There are no outstanding amendments to the claims.

V. SUMMARY OF THE INVENTION

The present invention is directed to a spatial sound conference system that enables participants in a teleconference to distinguish between and identify speakers based on virtual location cues (see page 4, lines 6-9). Spatial sound information may be captured using a dummy head 101 at a conference table 120 (see page 4, lines 9-10; Figures 1, 1A), or spatial sound information may be added to a participant's monaural audio signal using head-related transfer functions (page 6, lines 17 -18) based on an assigned virtual location of a speaker (see page 4, lines 10-13; page 11, line 27 – page 12, line 3; Figure 2). Spatial sound signals may be reproduced on spatially disposed loudspeakers preferably positioned near the ears of a listener (see page 4, lines 13 –14; page 7, lines 10 –13; Figures 1 and 1A). The spatial sound conference system is designed to enable conferences across a digital network (see page 4, lines 14 –16; page

5, line 20; page 6, lines 19 – 28). In addition to audio conferences, the system can provide spatial sound to audiovisual conferences, long distance learning systems, or virtual reality environments implemented across a network (see page 4, lines 16 –18)

Head-related transfer functions (page 6, lines 17 -18) may be used to simulate the frequency response of audio signals across the head from one ear to the other ear to create a spatial location for a sound (see page 4, lines 19 – 21; page 11, line 27 – page 12, line 3). A computer-generated head-related transfer function (page 6, lines 17 -18) convolved with a single audio signal creates left and right audio signals (page 6, lines 13 - 28) with a spatial sound component (see page 4, lines 21 – 23). Inserting a spatial sound component in a teleconference enhances a listeners' ability to understand a particular speaker (even other than the loudest speaker) including during periods of interruption and overtalk (see page 4, lines 25 – 28).

For example, claim 1 recites:

1. A spatial sound conference system comprising:
a conference station (100) comprising:
right and left spatially disposed microphones (103, 105, page 5, lines 21 - 22) connected to a communications channel (ISDN facilities 150, page 6, lines 8 - 11, lines 19 - 26; page 12, lines 3 - 6; page 15, lines 6 -22) for receiving right and left audio signals (page 6, lines 13 – 28), wherein the differences between the right and left audio signals represent a head-related transfer function (page 6, lines 17 -18); and
a remote station (199, page 7, lines 7 - 28) comprising:
right and left spatially disposed loudspeakers (113, 115; page 7, lines 10 - 18) connected to the communications channel (ISDN facilities 150).

(Note that references to the Figures and specification are illustrative of an embodiment of the invention and are not intended to limit the scope of the claims.)

Independent apparatus claims 15 and 24 and independent method claims 13, 19, 22 and 27 further recite:

13. A method for conducting a spatial sound conference comprising the steps of:

converting audio information into right and left audio signals at a conference station (page 6, lines 13 – 17), wherein the conversion imparts a differential characteristic to the right and left audio signals (page 6, lines 17 – 18), and the differential characteristic is represented by a head-related transfer function (page 6, lines 17 - 18; page 4, lines 19 – 25), and the right and left audio signals comprise spatialized audio (page 11, lines 28 – 31; page 12, lines 30 – 31);

transmitting audio information representative of said spatialized audio from the conference station across a communications channel (ISDN facilities 150, page 6, lines 8 -11, lines 19 - 26; page 12, lines 3 - 6; page 15, lines 6 - 22) to a remote station (199, page 7, lines 7-28; page 6, lines 19 - 24); and

playing the spatialized audio in the remote station (199, page 7, lines 7 – 28; page 7, lines 7 – 12).

15. A spatial sound conference system comprising:

a transmitting station (310; page 14, lines 22 - 29) comprising:

a microphone (307; page 14, lines 28 –29) connected to a communications system for receiving an audio signal;

a head-related transfer function unit (335; page 16, lines 7 - 12) connected to the communications system (350, page 15, lines 6 – 7) for imparting a head-related transfer function (page 15, lines 6 - 9) to the audio signal to produce a spatialized audio signal (page 15, lines 13 –23); and

a receiving station (310) comprising:

right and left spatially disposed loudspeakers (303, 305; page 14, lines 24 – 26) connected to the communication system (350) for receiving the spatialized audio signal (page 16, lines 23 – 27).

19. A method for conducting a spatial sound conference comprising the steps of:

receiving an audio signal at a transmitting station (page 14, lines 28 – 29)

transmitting the audio signal from the transmitting station to a spatial sound conference bridge (page 15, lines 6 – 8);

imparting a head-related transfer function (page 6, lines 17 -18) to the audio signal to create a spatialized audio signal (page 15, lines 7 – 9; page 16, lines 3 - 10);

sending the spatialized audio signal from the spatial sound conference bridge to a receiving station (page 16, lines 19 – 22); and

playing the spatialized audio signal on spatially disposed loudspeakers at the receiving station (page 16, lines 25 – 27).

22. A method for conducting a spatial sound conference comprising the steps of:

receiving an audio signal at a transmitting station (page 14, lines 28 – 29);

transmitting the audio signal from the transmitting station to a receiving station (page 16, lines 19 – 22);

imparting a head-related transfer function (page 6, lines 17 -18) to the audio signal to create spatialized audio signal (page 15, lines 7 – 9; page 16, lines 3 – 10; page 16, lines 27 – 30; page 17, lines 4 – 5);

playing the spatialized audio signal on spatially disposed loudspeakers in the receiving station (page 16, lines 25 – 27).

24. A spatial sound conference bridge comprising:

at least two input ports (201, 202, 203, 204) for receiving at least two audio signals (page 12, lines 3 – 6);

a head-related transfer function unit (205) connected to the at least two input ports (201, 202, 203, 204) for imparting a head-related transfer function to at least one received audio signal to produce at least one spatialized audio signal (page 12, lines 25 – 27, lines 30 - 31); and

at least two output ports connected to the head-related transfer function unit for transmitting the spatialized audio signal (page 13, lines 18 -19).

27. A method for conducting a spatial sound conference comprising the steps of: receiving at least two monaural audio signals (page 12, lines 3 – 6);

generating at least two sets of spatialized audio signals from the at least two monaural audio signals using at least two head-related transfer functions (page 12, line 23 – page 13, line7);

compiling at least one composite signal from the at least two sets of spatialized audio signals (page 13, lines 8 – 18);

transmitting at least one composite signal to a location (page 13, lines 18 – 19); and

playing at least one composite signal at the location. (page 16, lines 23 – 27).

VI. ISSUE ON APPEAL

Whether the Examiner erred in finally rejecting claims 1-27 under 35 U.S.C. § 103(a) as being obvious in light of a combination of Begault., in view of Lowe et al. ('799), Lowe et al. ('975) or Lowe et al. ('462).

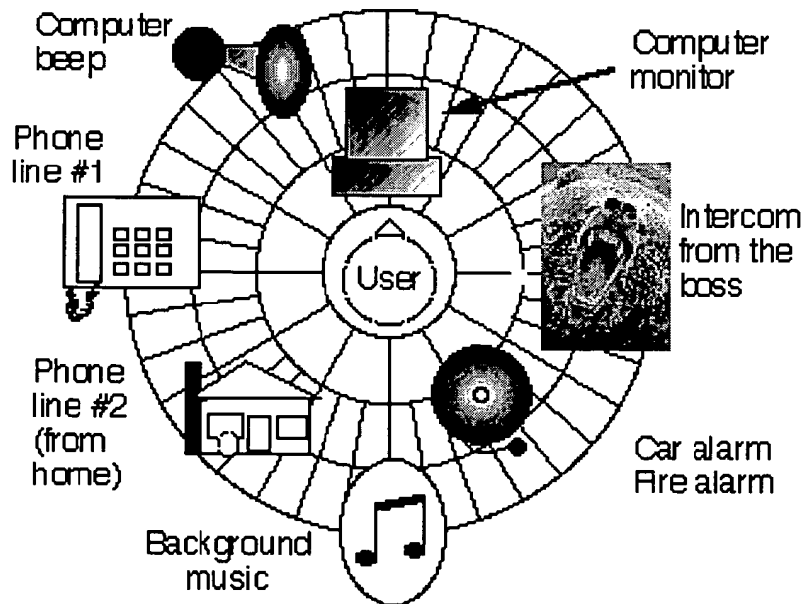
VII. GROUPING OF THE CLAIMS

The claims stand or fall together with regard to the rejection.

VIII. SUMMARY OF THE ARGUMENT

The Examiner has maintained the rejection of all pending claims under 35 U.S.C. §103(a) as described in the Office Action mailed May 8, 2003 and reaffirmed in the Final Office Action mailed November 4, 2003. The Examiner contends that all claims are unpatentable over Begault in view of the Lowe et al ('799), Lowe et al ('975) , and Lowe et al ('462) combination (hereinafter, Lowes').

In connection with claims 1-9, 12, 15-18, and 24-26, the Examiner takes the position that Begault discloses a computer workstation with 3-D audio for use by a plurality of participants/conferrees in teleconferencing environment (spatial audio teleconferencing). The



Examiner refers to Fig. 5.12

(shown at left) on page 215 for showing a layout of a conferee with a computer workstation that comprises

a conference station.

The Examiner relies on the Lowe disclosures for teaching localizing sound signals "to

simulate spatial effects (HRTF)" According to the Examiner, it would have been obvious to make the combination to provide better localization.

The rejection is believed improper because, *inter alia*, the Begault article is not enabling, there is no motivation found for combining the teachings, and because the claimed invention

including a head-related transfer function would not result. For these reasons, as are more fully presented below, the rejections must be reversed.

IX. ARGUMENT

The rejection of claims 1-27 under 35 U.S.C. § 103(a) as being obvious over Begault in view of the Lowe et al ('799), Lowe et al ('975), and Lowe et al ('462) is improper.

Claims 1-27 stand rejected over Begault, Durand R., *3-D Sound for Virtual Reality and Multimedia*, 1994, Academic Press, Inc., pgs 213 – 216 (hereinafter “Begault”) in view of U.S. Patent Nos. 5,105,462; 5,371,799 and 5,436,975 of Lowe et al. (hereinafter “Lowe ‘462”, “Lowe ‘799”, and “Lowe ‘975”, collectively the “Lowe patents”).

According to the Examiner:

Regarding claims 1- 9 , 12, 15- 1 8 , and 24-26, Begault discloses a computer workstation with 3-D audio for use by a plurality of participants/conferees in teleconferencing environment (spatial audio teleconferencing). Fig. 5.12 on page 215 shows a layout of a conferee with the computer workstation that is inherently including coupling means (conference transmission system) for coupling the apparatus to transmission lines from a far-end conferees located remotely from the conferee (i.e., multiconversation teleconferencing) and with compression unit and decompression unit providing A/V signals compression and decompression at the transmitting end and receiving end of the conference transmission lines, the coupling means including a plurality of ports, each one for receiving audio sound signals from a respective one of the far-end conferees, the conferee being provided with a headphone for receiving spatialized audio signal and to detect direction of origin of a teleconference speaker and route that voice to a speaker of channel in a manner to spatially locate such voice (i.e., virtual sound location) (Begault, pages 213-216). And the computer conference workstation as shown by Begault are generally including video camera for video image capturing, and microphones and loudspeakers for receiving and reproducing audio signals for the respective conferees at the far-end and the near-end.

Office Action dated May 8, 2003 at page 3.

As an initial matter, the rejection is improper as Begault cannot be properly applied under 35 U.S.C. §103 because it is not enabling, i.e., it describes, in its own words, a “[l]ayout for a

hypothetical GUI for arranging a set of incoming sounds.” Begault, caption of Figure 5.12 at page 175. The “Audio Windows” that is a subject of the cited portion of the text is clearly indicated to be a mere “concept”, with no supporting detail provided. The cited portion of Begault amounts to no more than an academic discussion of what could be, a wish-list of features. Even the GUI of Figure 5.12 is merely a general concept; there are no controls shown, no menus, none of the accouterments of a functional GUI. Nor does the cited portion of text provide any details necessary to implement either the Audio Windows concept to which it is directed or, more importantly, the subject matter of Applicants’ claims.

For a reference to anticipate or render obvious a claim, it must enable those skilled in the art to practice the claimed invention; Begault fails to give sufficient detail to put even the described subject matter into the hands of the public, much less the invention of Applicants’ claims. The requirement that a reference be enabling is clearly set forth in the M.P.E.P.:

2121.01 Use of Prior Art in Rejections Where Operability Is in Question

"In determining that quantum of prior art disclosure which is necessary to declare an applicant's invention 'not novel' or 'anticipated' within section 102, the stated test is whether a reference contains an 'enabling disclosure'... ." In re Hoeksema, 399 F.2d 269, 158 USPQ 596 (CCPA 1968). A reference contains an "enabling disclosure" if the public was in possession of the claimed invention before the date of invention. "Such possession is effected if one of ordinary skill in the art could have combined the publication's description of the invention with his [or her] own knowledge to make the claimed invention." In re Donohue, 766 F.2d 531, 226 USPQ 619 (Fed. Cir. 1985).

The cited portion of Begault provides no more than a discussion of desired functionality with no description of how such functionality may be achieved. One of ordinary skill in the art would not be put in possession of either the subject matter described nor Applicants’ claimed invention by the reference. While “a non-enabling reference may qualify as prior art for the

purpose of determining obviousness under 35 U.S.C. 103” (M.P.E.P. §2121.01(II), citing *Symbol Techs. Inc. v. Opticon Inc.*, 935 F.2d 1569, 1578, 19 USPQ2d 1241, 1247 (Fed. Cir. 1991)), this does not expand what is taught by the reference beyond that which is actually disclosed. “In order to render a claimed apparatus or method obvious, the prior art must enable one skilled in the art to make and use the apparatus or method.” *Rockwell International Corp. v. United States*, 147 F.3d 1358, 1365, 47 USPQ2d 1027, 1032 (Fed. Cir. 1998) quoting *Beckman Instruments, Inc. v. LKB Produkter AB*, 892 F.2d 1547, 13 USPQ2d 1301 (Fed. Cir. 1989), *aff’d* 930 F.2d 37 (Fed. Cir. 1991) (unpublished). Begault does not enable others to make and use the invention nor do Lowes’ cure this deficiency in Begault, as to be discussed below. Accordingly, the rejection under 35 U.S.C. §103(a) is improper and should be reversed.

The Examiner addresses this defect by asserting that the arguments “fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references. The virtual space auditory arrangement discloses [sic.] by Begault clearly shows the functionality of using computer workstation for conference as stated in the rejection above.” Office Action at page 3.

In response, the Examiner is both factually and legally mistaken. Factually, referring to page 5 et seq. of the prior Response, Applicants cite specific claim language and argue that Begault “fails to describe right and left spatially disposed microphones connected to a communications channel”. Legally, there can be no need to point out specific claim language where the foundation of the rejection is improper. Where a publication is not properly available to be applied under the statute, the Examiner has failed to meet his burden in formulating a prior art rejection; there can be no need to point out claim language distinguishing the invention over

teachings that are improperly asserted. Here, Beagault cannot be attributed with the teachings asserted by the Examiner because the publication fails to provide an enabling disclosure. "In determining that quantum of prior art disclosure which is necessary to declare an applicant's invention 'not novel' or 'anticipated' within section 102, the stated test is whether a reference contains an 'enabling disclosure'... ." MPEP §2121.01 *Use of Prior Art in Rejections Where Operability Is in Question* citing *In re Hoeksema*, 399 F.2d 269, 158 USPQ 596 (CCPA 1968).

Thus, the issue is not what may or may not have been suggested by Beagault, but what is enabled by Beagault. Here, the reference itself indicates that what is illustrated is a "concept" and gives no other details. While the Examiner may cite additional references and provide extrinsic evidence of enablement (see, e.g., MPEP §2131.01(I)), this has not been done. Thus, Beagault is not a proper basis for the outstanding rejection.

Further, even if Beagault did enable all that the Examiner asserts is taught by the publication, the rejection is still improper for a lack of motivation to make the combination asserted. To establish a prima facie case of obviousness there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. No such motivation is present here.

The Begault text is over 290 pages from which the Examiner selectively cites some four pages as being relevant to the claims of the instant application, and then posits that one skilled in the art would have looked to the teaching of the Lowe patents and modified Begault accordingly:

...It would have been obvious to utilize the Lowes' combination in the teleconferencing environment of Begault to actually create a far better localization of audio signals for the conferee with simple amplitude panning. And each of the conferees (at the far-end or near-end) would have a much improved localizing sound system for identifying others in the teleconference because of the

better sound localization. Furthermore, the improved teleconference apparatus as taught by the combinations above would have altering or allocating the audio conference signals by of each participant for the entire duration of the teleconference when the improved apparatus is in used. ...

Office Action at pages 3 - 4.

The problem is that such rational constitutes no more than hindsight. All new inventions are new combinations of the old; many provide some advantage over the prior art. However, it is not sufficient to recognize that the combination would provide certain advantages unless such advantages were known in the prior art *because the combination was known*. Here there is no evidence that there was any motivation for making the combination asserted by the Examiner. There is no mention by Begault to utilize a system for localizing various sound signals via signal transmission lines and impart phase variation to such signals to simulate spatial effects. Begault does not mention the desirability of creating an improved localization of audio signal, much less suggest that any such localization be accomplished, as the Examiner asserts, as taught by the Lowe patents.

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In *re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990). Although a prior art device “may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so.” (916 F.2d at 682, 16 U.S.P.Q.2d at 1432.). See also In *re Fritch*, 972 F.2d 1260, 23 U.S.P.Q.2d 1780 (Fed. Cir. 1992) (flexible landscape edging device which is conformable to a ground surface of varying slope not suggested by combination of prior art references).

It is well established that, even if all aspects of the claimed invention were individually known in the art, such is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the teachings of the references. *Ex parte Levengood*, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). It is, therefore, incumbent upon the Examiner to provide some suggestion of the desirability of doing what the inventor has done in the Examiner's formulation, imposition and maintenance of a rejection under 35 U.S.C. 103(a). "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 U.S.P.Q. 972, 973 (Bd. Pat. App. & Inter. 1985).

Still further, even if the combination of Begault and Lowe were both enabled and proper, the claimed invention would not result. This is because, while Lowe '462 may use a transfer function at a receiver location to simulate placement of objects in various acoustical locations, it does so to simulate an acoustical environment not to identify actual locations of a speaker at a point of origin so that a distant listener might distinguish the voice of the speaker from other voices and noises. Thus, Lowe '462 would process one or more audio signals at a remote location using a transfer function, not transmit from point of origin to a remote station audio signals having a difference that represents a head-related transfer function. The sole Lowe patent specifying a "head-related transfer function", Lowe '799, does so only in the context of processing an audio signal for use with headphones so as to simulate a sound source "outside of the listener's head". Lowe '799 does not teach or suggest the use of a head-related transfer

function to provide location information to a remote listener to assist the listener to distinguish between speakers.

With reference to Lowe '462, since Lowe would subject audio to a transfer function at a destination, not as part of signal used to distinguish the voice of one speaker from that of another, it would fail to teach or render obvious:

a communications channel receiving right and left audio signals having a difference representing a head-related transfer function with a remote station connected to the communications channel, the remote station having right and left spatially disposed loudspeakers (claim 1);

transmitting spatialized audio signals related by a head-related transfer function to a remote station where it is played (claim 13);

a head-related transfer function unit for imparting a head-related transfer function to produce spatialized audio signal that are received at a receiving station (claim 15);

receiving two audio signals, imparting a head-related transfer function to at least one of the audio signals to produce at least one spatialized audio signal, and transmitting the spatialized audio signal (claims 24); or

generating two sets of spatialized audio signal from two monaural signal using two head-related transfer functions, compiling a composite signal, and transmitting that signal to a location (claim 27).

Similarly, Lowe fails to suggest the subject matter of claim 24 which requires imparting a head-related transfer function to produce a spatialized audio signal. While Lowe '799 describes a head-related transfer function, this use is only in connection with playback over headphones so that a sound appears to be emanating from a source located outside of a listener's head. There is

no suggestion that a head-related transfer function be used to provide location information to a human listener allowing the listener to distinguish the voice of a speaker from that of other speakers.

While Figure 6 of Lowe '462 shows Dummy Head 605 having left and right microphones 606 and 607, this configuration is not part of the Lowe device but is described as an experiment used in testing the processing system that is the subject of the disclosure . That is, Lowe describes generating a processed sound through loudspeakers 602 and 603, with Dummy Head 606 being positioned in room 604 in place of a human subject. Instead, the subject or "Real Listener" is located in room 614. Note that Lowe depicts a direct connection between respective right microphone 607 and right loudspeaker 613 and a similar direct connection between left microphone 606 and left loudspeaker 612. There is no suggestion of using a head-related transfer function as required by claim 1 in this experimental configuration other than as part of the configuration being tested that does not include left and right microphones. Accordingly, the subject matter of the independent claims is not rendered obvious by the combination of Begault and Lowe. To the contrary, the cited references teach away from rather than suggest the claimed subject matter.

Thus, for the reasons presented, the combination of Begault and Lowe is believed to be improper thereby rendering the rejection under 35 U.S.C. §103(a) improper.

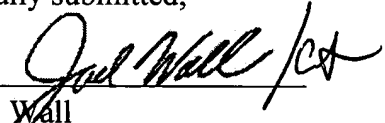
X. CONCLUSION

Appellant respectfully submits that the rejection of claims 1-27 under 35 U.S.C. §103(a) is not sustainable for the reasons set forth herein. Reversal of the rejection is respectfully solicited.

Dated: May 12, 2004

Respectfully submitted,

By


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